

**PATENT APPLICATION**  
**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

Docket No: Q86875

Go NAGAYA

Appln. No.: 10/530,180

Group Art Unit: 3618

Confirmation No.: 5597

Examiner: Frank Bennett VANAMAN

Filed: April 4, 2005

For: IN-WHEEL MOTOR SYSTEM FOR A STEERING WHEEL

**APPEAL BRIEF UNDER 37 C.F.R. § 41.37**

**MAIL STOP APPEAL BRIEF - PATENTS**

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellant submits the following:

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**I. REAL PARTY IN INTEREST**

Based on the information supplied by Appellants, and to the Appellants' legal representatives' knowledge, the real party in interest is the assignee, Kabushiki Kaisha Bridgestone.

**II. RELATED APPEALS AND INTERFERENCES**

Appellants, as well as Appellants' assigns and legal representatives, are unaware of any appeals or interferences which will be directly affected by, or which directly affect will have a bearing on, the Board's decision in the pending case.

### **III. STATUS OF CLAIMS**

Claims 1-6 are all the claims pending in the present application. Claims 1-6 have been finally rejected, and are the subject of this appeal. The pending claims are set forth in the Appendix.

**IV. STATUS OF AMENDMENTS**

No amendments have been submitted subsequent to the Final Office Action dated March 5, 2009.

**V. SUMMARY OF THE CLAIMED SUBJECT MATTER**

An exemplary embodiment of the present invention relates to an in-wheel motor system for mounting a direct drive motor to a wheel. The in-wheel motor system includes: a first knuckle which is connected to an upper suspension arm, a lower suspension arm and a non-rotary side of the direct drive motor, and is locked in a steering direction (*see, e.g., page 6, lines 4-18*); and a second knuckle which is connected to a steering rod and to the first knuckle in such a manner that the second knuckle turns on a king pin axis in the steering direction and is fitted with a brake unit and the wheel (*see, e.g., page 6, lines 4-18, Fig. 1, element 7*). *See, e.g., claim 1.*

**VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

1. Claim 1 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Baker et al. (U.S. Patent No. 3,472,331) in view of Iizuka et al. (U.S. Patent No. 5,224,563).

2. Claims 2-6 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Baker in view of Iizuka, and further in view of Nelson (U.S. Patent No. 3,468,389).

## VII. ARGUMENT

- A. **Neither Baker nor Iizuka, alone or in combination, renders claim 1 unpatentable under 35 U.S.C. § 103(a). For example, the applied references do not disclose or suggest at least, “a first knuckle which is connected to an upper suspension arm, a lower suspension arm and a non-rotary side of the direct drive motor, and is locked in a steering direction,” and “a second knuckle which is connected to a steering rod and to the first knuckle in such a manner that the second knuckle turns on a king pin axis in the steering direction and is fitted with a brake unit and the wheel,” as recited in claim 1.**

Brief descriptions of the applied references, Baker and Iizuka, are as follows.

Baker is directed to an invention that is intended for use in the environment of a front steering drive axle assembly having a driver axle rotatably supported in an axle housing and a driven axle rotatably supported in a wheel hub in outgoing and spaced relation to said driver axle and in axial alignment therewith. A Cardan-type universal joint (26) connects the axles together while improved pivot means is provided for mounting the drive axle for horizontal movement with respect to the drive axle. The pivot means comprises a yoke arm arrangement (22,24) which ensures substantially equal loading to both the upper and lower yoke and bracket arms (80,82) and a resilient deformable dampening (152) and bearing (108,144) means disposed between the king pin bearings and the yoke arms to suppress vibration and provide anti-shimmy characteristics to the steering drive axle assembly. *See Abstract of Baker.*

Iizuka is directed to an energy regenerating mechanism of an automobile, particularly to that adapted for an electric car. The energy regenerating mechanism is characterized in that a plurality of generators are provided so that the kinetic energy generated when the engine idles and the automobile continues running is converted into electric energy. *See Abstract of Iizuka.*



With respect to independent claim 1, Appellant submits that the applied references, alone or in combination, do not disclose or suggest at least: 1) “a first knuckle which is connected to an upper suspension arm, a lower suspension art and non-rotary side of the direct drive motor, and is locked in a steering direction,” and 2) “a second knuckle which is connected to a steering rod and to the first knuckle in such a manner that it can turn on a king pin axis in the steering direction and is fitted with a brake unit and the wheel,” (emphasis added) as recited in claim 1.

With respect to the first limitation quoted above, in the Office Action dated July 18, 2007, the Examiner states that Baker discloses the first knuckle (22) and second knuckle (19, 21, 82 and 85). Also, the Examiner acknowledged that Baker fails to teach a drive source as comprising a motor, however the Examiner applied Iizuka to allegedly satisfy this particular deficiency. Though there was not a limitation that “a first knuckle is connected to the upper and lower suspension arm” in the original claim 1, Appellant has filed the amendment adding the limitation that “a first knuckle is connected to a suspension member” and then the limitation that “a first knuckle is connected to an upper and lower suspension art” to the claim 1. In response to this allegation, Appellant submits that even if, *arguendo*, Iizuka discloses a motor for a wheel, there is no teaching or suggestion in either of the applied references of how such a motor would be incorporated into the wheel shown in the illustration of Baker. As shown in Figs. 5 and 6 of Iizuka, the motor 21 is not the wheel (23). That is, Iizuka does not disclose the in-wheel motor. The Examiner appears to have picked and chosen different components of two different references and alleged that they are combinable without further support or explanation. The illustration of Baker shows wheel related components within the wheel (i.e., the in-wheel motor)

that do not leave room for the inclusion of a motor, and nowhere do either of the references disclose how a motor from Iizuka would be incorporated into the wheel related components of Baker. Therefore, absent any teaching or suggestion with respect to such a combination, Appellant submits that the above-quoted features of claim 1 are clearly not satisfied by the applied references, alone or in combination.

Though the examiner regards the numeral reference (22) as the first knuckle, it denotes the upper yoke arm constituting the suspension yoke (14) and it is not a part corresponding with the first knuckle according to claim 1. Also, the reference numeral (19) and (21) denote the kingpin bearing assemblies, (82) denotes the bracelet arm and (85) denotes the flange. On the other hand, because the knuckle according to Baker is the spindle knuckle (81), Appellant believes it mistake that the Examiner considers that Baker discloses the first knuckle (22) and the second knuckle (19, 21, 82 and 85).

With respect to the second feature quoted above, even though this feature is not satisfied by the applied references, in the Office Action dated July 18, 2007, the Examiner simply alleged that Baker teaches an arrangement for a steerable wheel and that it is very well known in the art to connect a steering rod to a pivoting wheel support to allow the wheel to be steered. In response, Appellant maintains the argument set forth in the Amendment dated October 18, 2007, that even if, *arguendo*, the above statement of the Examiner is true, the Examiner has not identified a steel rod in either of the applied references and explained how any such steel rod would be connected to a second knuckle, as recited in claim 1. Baker discloses only one knuckle

(a spindle knuckle) and does not disclose and suggest the first knuckle according to the present invention. Therefore, Appellant believes that Baker does not disclose the second knuckle.

Further, Appellant submits that the present invention has the feature that a knuckle is divided into a first knuckle and second knuckle and a in-wheel motor is mounted on the first knuckle to which the steering rod is not connected so that the motor cannot be involved in the steering direction in turning. Thus, the in-wheel motor system according to the present invention produce advantageous effects that increasing of moment of inertia on steering axis can be reduced greatly and steering torque can be reduced surely.

Without being motivated to “reduce a moment of inertia on a steering shaft”, it is hardly possible to connect a non-rotary side of a motor to the first knuckle to which the steering rod is not connected. Also, Baker and Iizuka do not provide a motivation that reducing of moments of inertia regarding the steering shaft.

In response, in the Office Action dated January 11, 2008, the Examiner alleges, in part:

Appellant’s comments, filed with the Amendment, have been carefully considered. ... One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response, Appellant submits that the previous arguments were not intended to attack references individually even though the rejections are based on combinations of references. Appellant was simply responding to the assertions of the Examiner about what the individual references allegedly disclose and how Appellant believes there is no teaching or suggestion in

either of the applied references, alone or in combination, that each and every feature of the claimed invention, as recited in claim 1, is satisfied.

Further, in the January 11, 2008 Office Action, the Examiner alleges:

As regards the reference to Baker and the provision of a steering rod, the examiner agrees that Baker does not explicitly illustrate this element. Appellant is reminded, as was noted previously, the Baker's structure is explicitly steerable, and the use of a steering rod connected to a turnable knuckle portion is exceptionally old and notoriously well known (note, for example such teachings as presented in Iizuka et al. and Yamashita et al., both cited previously), as such, it is deemed obvious to provide an old and very commonly known arrangement to implement the steerability which is already conceptually anticipated by Baker.

In response, Appellant submits that even if, *arguendo*, it is old and well known in the art that a steering rod could be connected to a turnable knuckle portion, there is no teaching or suggestion of how a steering rod, which is not shown in the applied references, would be connected with the particular arrangement of the present claimed invention. Here, claim 1, for example, recites two separate knuckles, a first knuckle and a second knuckle, and their respective accompanying features. Therefore, a general statement of it being old and well known in the art for a steering rod to be connected to a knuckle does not necessarily satisfy the claimed features and arrangements set forth in claim 1.

Further, Appellant submits that Iizuka does not disclose an in-wheel motor system, since the motor 21 (the non-rotating side of the motor) according to Iizuka is connected to the vehicle body and not connected to the non-rotating part (knuckle) in a vehicle wheel.

Also, the Examiner asserts that it is well known to provide "a motor associated with a non-steered portion" (page 4, line 3 in the Office Action). The Examiner appears to be asserting

that Iizuka is configured to disconnect the non-rotating part of the motor from the steered linkage. However, Appellant submits that it is only natural that the vehicle body and the steered linkage are disconnected from each other. There is no ground for the assertion of the Examiner that the non-rotating part and the steered linkage are disconnected from each other in Baker and Iizuka.

Further, since Baker and Iizuka do not disclose or suggest how the in-wheel motor is installed, Appellant submits that one of ordinary skill in the art would not have arrived at the feature of the present invention that a non-rotating side of the motor is connected to the first knuckle, by combining Baker and Iizuka.

Yet further, Appellant submits that the applied references, including Baker, do not disclose or suggest a first knuckle which is connected to an upper suspension arm and lower suspension arm. Appellant respectfully traverses the Examiner's allegation in the Office Action dated September 19, 2008, that Baker teaches that "a first knuckle (top of 22) is connected to a suspension member (14)", since it is clear from claim 1, col. 2, lines 42 to 44 and col. 3, lines 15 to 19 of Baker that reference numeral 14 denotes a suspension yoke including an upper yoke arm (22) and lower yoke arm (24). According to Baker, spindle knuckle (80) is connected to the upper yoke arm (22) and lower yoke arm (24). The Examiner alleges that this spindle knuckle (80) corresponds to the second knuckle. However, as indicated above, Baker does not teach or suggest a first knuckle which is connected to an upper and lower suspension arm, as recited in amended claim 1. That is, Baker does not disclose or suggest a knuckle that is divided into two parts.

Further, Appellant submits that there is no description about “a knuckle” in Iizuka.

On the Office Action dated September 19, 2009, the Examiner has regarded the first knuckle of Baker as “the top of 22”. That is, the Examiner’s previous characterization of the invention has changed. Also, he insisted that “the top of 22” corresponds with the first knuckle of the present invention, since it is connected to the suspension yoke (14).

Further, the Examiner changed his characterization of the present invention with respect to the spindle knuckle (81) being the second knuckle.

However, since “the top of 22” is an upper yoke arm, which is a part constituting the suspension yoke (14), “the top of 22” does not correspond to the first knuckle.

Appellant has emphasizes that the top of 22 does not correspond to the first knuckle.

The reference “122” denotes the “upper king pin”.

The Examiner’s position is not consistent and the Examiner has just simply concluded that Baker allegedly discloses the first knuckle and second knuckle without support for this position.

#### Subtle Change of Rationale

In the Office Action dated March 5, 2009, the Examiner subtly changes the arguments presented in previous Office Actions. For example, the Examiner alleges in the March 5 Office Action that kingpin 22 of Baker allegedly corresponds to the claimed first knuckle. In response, Appellant submits that one of ordinary skill in the art would clearly recognize that a kingpin does not correlate to a knuckle, and further submits that it appears that the Examiner has not been

consistent in his rationale because the applied art, alone or in combination, does not disclose or suggest the claim limitations.

Further, in the March 5 Office Action, the Examiner maintains, in part:

Appellant's comments, filed with the amendment, have been carefully considered. Appellant has asserted that Baker et al. fail to teach a first knuckle connected to upper and lower suspension arms. The examiner does not agree: Baker's element 122 may reasonably be interpreted as a knuckle, element 22 may be interpreted as an upper suspension arm and element 24 may be reasonably interpreted as a lower suspension arm, the elements being "connected" to the breadth appellant has recited the connection. The modified interpretation of Baker et al. is applied herein in direct response to appellant's amendment. Appellant has further argued that Baker et al. does not disclose or suggest "a knuckle that is divided into two parts". It is not clear how this limitation relates to the claim recitation, and in that there appears to be no basis in the claims for a limitation of the knuckle being "divided into two parts", the examiner understands that appellant is attempting to convince the examiner to read unrecited limitations into the claims, which is not proper for prosecution. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response, Appellant submits that some of the arguments set forth in the previous responses were submitted in an effort to explain the differences between the claimed invention and the applied references to the Examiner. For example, the statement that a knuckle is divided into two parts is simply meant to convey that claim 1, for example, recites that there is a first knuckle and a second knuckle. And, Appellants were simply attempting to show that the Examiner has not demonstrated that the particular structural components of the claimed invention are satisfied by the applied references, alone or in combination.

Therefore, at least based on the foregoing arguments, Appellant submits that one of ordinary skill in the art would not have arrived at the claimed invention by combining Baker and Iizuka. In other words, neither Baker nor Iizuka, alone or in combination, discloses or suggests at least, “a first knuckle which is connected to an upper suspension arm, a lower suspension arm, and a non-rotary side of the direct drive motor, and is locked in a steering direction,” and “a second knuckle which is connected to a steering rod and to the first knuckle in such a manner that the second knuckle turns on a king pin axis in the steering direction and is fitted with a brake unit and the wheel,” as discussed above.

Accordingly, withdrawal of the rejection of claim 1 under 35 U.S.C. § 103 is respectfully requested.

**B. None of the applied references, alone or in combination, renders claims 2-6 unpatentable under 35 U.S.C. § 103(a).**

Appellant submits that dependent claims 2-6 are patentable at least by virtue of their indirect or direct dependencies from independent claim 1. Nelson does not make up for the deficiencies of Baker and Iizuka.

Further, with respect to dependent claim 5, in the Amendment dated October 18, 2007, Appellant submitted that the applied references, either alone or in combination, do not disclose or suggest at least, “wherein the output shaft of the motor and a wheel support hub mounted to the second knuckle are interconnected by constant velocity joints,” as recited in claim 5. That it, Appellant submitted that, in the Office Action dated July 18, 2007, the Examiner did not discuss this claim in any detail and did not identify where an output shaft of a motor and a wheel support hub would be mounted to a second knuckle, nor did the Examiner discuss the output shaft of the



motor and the wheel support hub being interconnected by constant velocity joints. Moreover, the Examiner did not identify constant velocity joints in any of the applied references.

Yet further, with respect to claim 6, in the October 18 Amendment, Appellant submitted that the Examiner did not even address the feature, "wherein the rotary portion of the motor and the wheel are interconnected by a flexible coupling having at least two direct-moving guides connected to each other in such a manner that their moving directions cross each other in the axial direction of the motor and a constant velocity joint-like coupling which has the center of its movement on a king pin axis and turns in the steering direction," as recited in claim 6, under the prior art rejection section of the Office Action.

In response, in the Office Action dated January 11, 2008, the Examiner alleges:

As regards the provision of CV joints, these elements are found in both the references to Baker (20-26, 26-28, particularly in the illustrated orientation) and Iizuka et al. (proximate 26, again in the illustrated orientation). As regards the very broad recitation of connection absent any further limitation in claim 6, note that in the combined references, in an interpretation of similar breadth to the recitation itself, the rotary portion of the motor is connected to the motor case, which is mounted to the vehicle through the buffer and direct moving guides, which include a flexible coupling (e.g., the buffer portions), the connection to the wheel being made through the wheel bearing, knuckle elements and non-turning knuckle supports connected to the vehicle; the arrangement further having a "CV joint-like coupling" (e.g., Baker at 20-26, 26-28).

To satisfy the features of claims 5 and 6, the Examiner simply cites couplings 20-26 and 26-28 of Baker and universal joint 26 of Iizuka. Couplings 20-26 and 26-28 are simply couplings between a driven axle 28 and a joint yoke 20. Further, in Iizuka, there is no motor even illustrated therein. Therefore, with respect to claim 5, for example, clearly the applied references do not satisfy the features of this claim, as claim 5 recites that an output shaft of a

motor and a wheel support hub mounted to a second knuckle are interconnected by constant velocity joints. This particular arrangement is nowhere shown in Baker or Iizuka. Similarly with respect to claim 6, the specific arrangement and features set forth in this claim are not satisfied by the alleged corresponding elements cited by the Examiner in the Office Action.

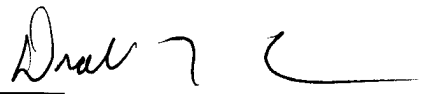
Therefore, at least based on the foregoing, Appellant maintains that claims 2-6 are patentably distinguishable over the applied references, alone or in combination.

### **Conclusion**

In summary, at least based on the foregoing, Appellant submits that the Examiner has not demonstrated that each and every feature of the claimed invention, as set forth in claims 1-6, is taught and/or suggested by the applied references, alone or in combination. Therefore, Appellant submits that claims 1-6 are patentably distinguishable over the applied art.

The USPTO is directed and authorized to charge the statutory fee (37 C.F.R. §41.37(a) and 1.17(c)) and all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Diallo T. Crenshaw  
Registration No. 52,778

SUGHRUE MION, PLLC  
Telephone: (202) 293-7060  
Facsimile: (202) 293-7860

WASHINGTON OFFICE

**23373**

CUSTOMER NUMBER

Date: October 5, 2009

**CLAIMS APPENDIX**

CLAIMS 1-6 ON APPEAL:

1. (rejected): An in-wheel motor system for mounting a direct drive motor to a wheel, comprising  
  
a first knuckle which is connected to an upper suspension arm, a lower suspension arm and a non-rotary side of the direct drive motor, and is locked in a steering direction; and  
  
a second knuckle which is connected to a steering rod and to the first knuckle in such a manner that the second knuckle turns on a king pin axis in the steering direction and is fitted with a brake unit and the wheel.
2. (rejected): The in-wheel motor system for a wheel according to claim 1, wherein the non-rotary side of the motor is connected to the first knuckle by elastic bodies and dampers, or elastic bodies having a spring or damper function.
3. (rejected): The in-wheel motor system for a wheel according to claim 2, wherein the non-rotary side of the motor is supported by direct-moving guides and a buffer member in the vertical direction of a vehicle.
4. (rejected): The in-wheel motor system for a wheel according to claim 3, wherein the non-rotary side of the motor is supported by direct-moving guides and a buffer member in the horizontal direction of a vehicle in addition to the vertical direction.

5. (rejected): The in-wheel motor system for a wheel according to any one of claims 2 to 4, wherein the output shaft of the motor and a wheel support hub mounted to the second knuckle are interconnected by constant velocity joints.

6. (rejected): The in-wheel motor system for a wheel according to any one of claims 2 to 4, wherein the rotary portion of the motor and the wheel are interconnected by a flexible coupling having at least two direct-moving guides connected to each other in such a manner that their moving directions cross each other in the axial direction of the motor and a constant velocity joint coupling which has the center of its movement on a king pin axis and turns in the steering direction.

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**EVIDENCE APPENDIX:**

NONE.

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**RELATED PROCEEDINGS APPENDIX**

NONE.